

Claims:

1. An apparatus for centralizing a well tool, comprising:

a tubular body having an axis and a passage extending therethrough along the axis;

a centralizer mounted to the tubular body around the passage, the centralizer being movable between a restricted position and an unrestricted position in response to contact with a well tool moving through the passage; and

at least one spring that urges the centralizing member to the restricted position.

2. The apparatus according to claim 1, wherein while in the restricted position, the centralizer defines an inner diameter less than an inner diameter of the passage and while in the unrestricted position, defines an inner diameter substantially equal to the inner diameter of the passage.

3. The apparatus according to claim 1, wherein the centralizer comprises a plurality of centralizing members, each of the centralizing members being rotatable about an axis parallel to the axis of the tubular body when moving between the restricted and unrestricted positions.

4. The apparatus according to claim 1, wherein the passage of the tubular member has an annular recess, and wherein the centralizer locates substantially entirely within the recess while in the unrestricted position.

5. The apparatus according to claim 1, wherein:

the passage of the tubular member has an annular recess;

the centralizer comprises a plurality of centralizing members, each centralizing member having an outer end mounted within the recess for rotation about an axis that is parallel to the axis of the tubular member; and

while in the unrestricted position, the centralizing members are substantially wholly located within the recess.

6. The apparatus according to claim 1, wherein the centralizer comprises:

a plurality of centralizing members mounted in the passage for rotation about an axis that is parallel to the axis of the tubular member; and

each of the centralizing members having a configuration in the shape of a paddle that is curved, when viewed in a cross-section perpendicular to the axis, at a radius that is substantially equal to a radius of the passage.

7. An apparatus for centralizing a well tool, comprising:

a tubular body having an axis and a passage extending therethrough along the axis;

a plurality of centralizing members having inner and outer ends; and

a plurality of axially extending hinge assemblies, each of the hinge assemblies being mounted to the tubular body in a circular array around a circumference of the passage, the outer end of each of the centralizing members being mounted to one of the hinge assemblies for rotation about the hinge assembly.

8. The apparatus according to claim 7, wherein each of the centralizing members is rotatable about one of the hinge assemblies from a restricted position with the inner ends located radially inward from the outer ends to an unrestricted position wherein the inner ends are substantially at the same radial distance as the outer ends.

9. The apparatus according to claim 7, wherein each of the hinge assemblies has a spring that urges each of the centralizing members to rotate to a restricted position wherein the inner ends of the centralizing members are closer to the axis of the tubular body than the outer ends.

10. The apparatus according to claim 7, wherein each of the hinge assemblies comprises:

a first hinge member;

a second hinge member located in engagement with and being rotatable relative to the first hinge member, each of the centralizing members being mounted to the second hinge member for rotation therewith; and

a cam and slot arrangement formed between the first and second hinge members, so that an axially directed force on the each of the centralizers causes the second hinge members to rotate.

11. The apparatus according to claim 7, wherein each of the hinge assemblies comprises:

a first hinge member stationarily mounted to the tubular body;

a second hinge member located in engagement with and being rotatable relative to the first hinge member, each of the centralizing members being mounted to the second hinge member for rotation therewith;

a cam and a slot formed between the first and second hinge members, the slot having a neutral position, an upper inclined portion extending upward from the neutral position, and a lower inclined portion extending downward from the neutral position, the cam being located in the slot such that a downward force on each of the centralizers causes the cams to locate within the upper inclined portions and the centralizers to rotate, and an upward force on the each of the centralizers causes the cams to locate within the lower inclined portions and the centralizers to rotate; and

at least one spring in cooperative engagement with the first and second hinge members to urge the cams to locate in the neutral position.

12. The apparatus according to claim 7, wherein the passage of the tubular member has an annular recess, and wherein the centralizing members locate substantially flush within the recess while in the unrestricted position.

13. The apparatus according to claim 7, wherein:

each of the centralizing members comprises a paddle that is curved, when viewed in a cross-section perpendicular to the axis, at a radius that is substantially equal to a radius of the passage.

14. An apparatus for centralizing a well tool, comprising:

a tubular body having an axis and a passage extending therethrough along the axis for receiving a well tool;

a plurality of centralizing members having inner and outer ends;

a plurality of axially extending stationary hinge members mounted to the tubular body in a circular array around a circumference of the passage;

the outer end of each of the centralizing members being mounted rotatably mounted to one of the stationary hinge members for pivotal rotation of the inner end to a restricted position closer toward the axis and an unrestricted position farther away from the axis;

a cam and a slot formed between the outer end of each of the centralizing members and the stationary hinge member, each of the slots having an upward inclined portion, a downward

inclined portion, and a neutral position located between the upward and downward inclined portions, the centralizing members being in the restricted position while the cam and the slot are in the neutral position; and

at least one spring in cooperative engagement with the outer end of each of the centralizing members and the stationary hinge members for urging the cam and the slot to the neutral position.

15. The apparatus according to claim 14, wherein:

an axial extent of the outer end of each of the centralizing members is greater than an axial extent of the inner end of each of the centralizing members;

each of the centralizing members has an upper edge and a lower edge, and wherein an inner portion of each of the upper and lower edges inclines relative to a plane perpendicular to the axis of the tubular member.

16. A method for centralizing a well tool, within a conduit of a well, comprising:

(a) mounting a centralizer to a tubular body around a passage of the tubular body, and biasing the centralizer members to a restricted position that defines an inner diameter less than an inner diameter of the passage;

(b) mounting the tubular body to the conduit; and

(c) lowering the well tool through the passage and the conduit, contacting the centralizer with the well tool, the contact causing the centralizer move from the restricted position to allow the well tool to pass.

17. The method according to claim 16, wherein step (c) further comprises biasing inner portions of the centralizer slidingly against the well tool as the well tool passes through the centralizer.

18. The method according to claim 16, wherein step (a) comprises providing the centralizer with a plurality of centralizing members, and pivotally mounting an outer end of each of the centralizing members to the tubular member.

19. The method according to claim 16, wherein:

step (a) comprises providing the centralizer with a plurality of pivotally mounted centralizing members; and

step (c) comprises pivoting each of the centralizing members about an axis that is parallel to an axis of the passage.

20. The method according to claim 16, wherein step (a) comprises providing the centralizer with an unrestricted position wherein the centralizer circumscribes an inner diameter substantially equal to an inner diameter of the passage.